SYNTHESIS AND CHARACTERIZATION OF MODIFIED MAGNETIC NANOPARTICLES IN NANOMEDICINE

Nadia M. Dieguez-Armenta¹, Paul Zavala-Rivera², Armando Lucero-Acuña²
¹ Departamento de Física, Posgrado en Nanotecnología, Universidad de Sonora, 83000, México. ² Departamento de Ingeniería Química y Metalurgia, Universidad de Sonora, 83000, México

Nanotechnology applied for the treatment, diagnosis, monitoring and control of biological systems have recently been referred as nanomedicine [1]. Among them, an increasing area of development has been the theranostic materials, which are those that can be used as contrast agents and therapy at the same time [2,5]. Currently, the research in biomedical applications of nanoparticles within the field of therapeutics focused on cancer has been intensified. Such nanoparticles are mostly made of iron oxide, which depending of its size, could have a superparamagnetic behavior, i.e. they require a large magnetic field to achieve its magnetic ordering below the critical temperature and it disappears in the absence of the aforementioned magnetic field [3]. With an appropriate chemical surface, magnetic nanoparticles have been widely used clinically in biomedical applications, such as contrast agent in magnetic resonance imaging, tissue repair, immunoassay, detoxification of biological fluids, hyperthermia, drug delivery and cell separation [4]. In this work, we focus on the synthesis of iron oxide nanoparticles coated with oleic acid which are carried out by the sonolysis method; the advantage of this synthesis is the fact of using low power equipment found in any laboratory such as the ultrasonic bath. Likewise, we looked for control of the size during the centrifugation process and to the modification into water-soluble nanoparticles for further functionalization with L-Cysteine and coating it with gold. Leading to the generation of a functionalized magnetic nanoparticle which present hyperthermia and contrast agent capabilities at the same time.

Keywords: iron oxide nanoparticles, magnetic, nanotechnology

References:


Presenting author's email: nadia.dieguez@gmail.com